

THE ENERGY OBSERVER

Energy Efficiency Information for the
Facility Manager

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Exit Signs

The Energy Observer summarizes published material on proven energy technologies and practices, and encourages users to share experiences with generic energy products and services. This quarterly bulletin also identifies informational sources and energy training for facility managers and staff. **The Energy Observer** is a service of the Energy Office, Michigan Department of Labor & Economic Growth.

The US Department of Energy estimates that there are over 100 million exit signs in use in the United States. Typically, these exit signs are lit by incandescent lamps and are estimated to consume 30 to 35 billion kilowatt-hours of electricity per year.

THE TECHNOLOGIES

Many types of exit signs are available in the market today. While purchase price is important when installing new exit signs you should also consider life expectancy, maintenance costs, and the cost of operation.

Some models offer savings of up to 85% over the standard incandescent lamp. While initial cost is higher on energy efficient models, the savings will supplement the cost in a relatively short amount of time.

Incandescent

This type of exit sign contains 1 or 2 incandescent lamps, typically a

clear glass bulb with a filament inside. These lamps produce light by resistance to an electrical current; heating the filament to a high temperature. Incandescent exit signs consume between 30 and 50 watts of electricity, and are the most energy intensive type of exit sign. Incandescent lamps will require replacement every 2 to 3 months.

Compact Fluorescent

This type of exit sign contains 1 or 2 U-shaped tubular Compact Fluorescent Lamps (CFL). These lamps produce light by exciting a mixture of argon and mercury vapor enclosed by a glass tube. CFL exit signs consume between 12 and 20 watts of electricity. CFLs will require replacement every 9 to 12 months.

Electroluminescent

This type of exit sign contains a thin layer of a phosphor-impregnated material between two

layers of conducting material. An electric current is passed through the phosphorus material causing it to emit light. The rated life of this type of exit sign is approximately 10 years.

LED (Light Emitting Diodes)

LED exit signs contain circuit boards with anywhere from 6 to 35 individual LED's. An LED is a semi-conducting diode that emits visible light when charged with electric current. This type of fixture consumes 1 to 8 watts of electricity. The expected life of an LED exit sign is 15-25 years with virtually no maintenance required.

Others

Other types of exit signs include photoluminescent, and self-luminous (tritium). These types are less popular for many reasons, mainly cost. Many of these self-luminous exit signs are only recommended for areas that are without electricity.

Exit Sign Comparisons

Sign Type:	Typical wattage	Life (years)	Annual Energy Cost (US \$)	Annual Maintenance Cost (US \$)	Upgrade Cost (US \$)
New Fixtures					
Incandescent	40	.8	28.00	19.50	N/A
CFL	10	2	7.00	9.50	90.00
Electro-luminescent	1	10	0.70	20.50	200.00
LED	2-5	25+	3.50	0.00	90.00
Retrofit Light Sources					
Reduced Watt. Incandescent	8-18	10	5.60	4.00	30.00
CFL	10	2	7.00	9.50	30.00
LED	2	25+	2.80	0.00	35.00

Source: EPA Green Lights, Lighting Upgrade Manual 1998

If you are considering purchasing this type of sign, verify that it meets the visibility requirements of the National Fire Protection Association (NFPA), UL 924 or your local Fire Marshal. Disposal may also be important. Some self-luminous signs require hazardous waste removal procedures, which can be quite expensive.



Picture from USDOE National Renewable Energy Lab.

RETROFIT KITS

Manufacturers offer incandescent, compact fluorescent and LED options for retrofitting your current exit sign fixtures.

Lower watt, incandescent lamps are available that offer an extended life expectancy. These would be a direct replacement for your current lamp. Compact fluorescent lamps are also available as direct replacements, offering an even lower wattage and also a longer life expectancy.

LED retrofit kits are also available in many forms. These very low wattage options are also available

in a direct replacement lamp. The LEDs are mounted on a circuit board inside of a glass bulb with a standard incandescent base. The LED retrofit options will last up to 25 years without replacement, virtually eliminating maintenance needs.

When using a retrofit kit vs. replacing the fixture be sure that your current fixture is clean, in good working condition and meets visibility requirements.

These retrofit options can save you energy, time and maintenance costs without having to purchase all new fixtures.

10-YEAR COST COMPARRISON

	Incand.	CFL	LED
Initial purchase cost	\$20-\$100	\$125-\$200	\$80-\$250
10-year Energy and maint. Costs	\$390-\$490	\$130-\$172	\$7-\$21
Source: Inform Inc., <i>Purchasing for Pollution Prevention Program Fact Sheet</i> , Nov. 2003			

LIFE-CYCLE COST ANALYSIS

When evaluating exit sign technologies the important areas to consider are fixture cost, energy usage, and lamp life. When these factors are all compared the LED fixture is the most cost effective option.

Even though the initial fixture cost for the LED fixture is higher in comparison with the other options, the overall 10-year cost is much lower. The 10-year Cost Comparison Chart illustrates this point.

FOR MORE INFORMATION...

ENERGY STAR offers *free tools and seminars* for evaluating building performance and equipment efficiency. www.energystar.gov

The Federal Energy Management Program (FEMP) offers many resources, and technology recommendations for achieving energy efficiency. www.eere.energy.gov/femp/

Visit the Energy Office website for information on current programs, services, past issues of *The Energy Observer* and grant information. www.michigan.gov/energyoffice

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